Volunteer Lake Assessment Program Individual Lake Reports
WALKER POND, BOSCAWEN, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,888	Max. Depth (m):	12.8	Flushing Rate (yr¹)	3.2	
Surface Area (Ac.):	174	Mean Depth (m):	4.5	P Retention Coef:	0.51	
Shore Length (m):	4,000	Volume (m³):	3,205,500	Elevation (ft):	500	

TROPHIC CLASSIFICATION

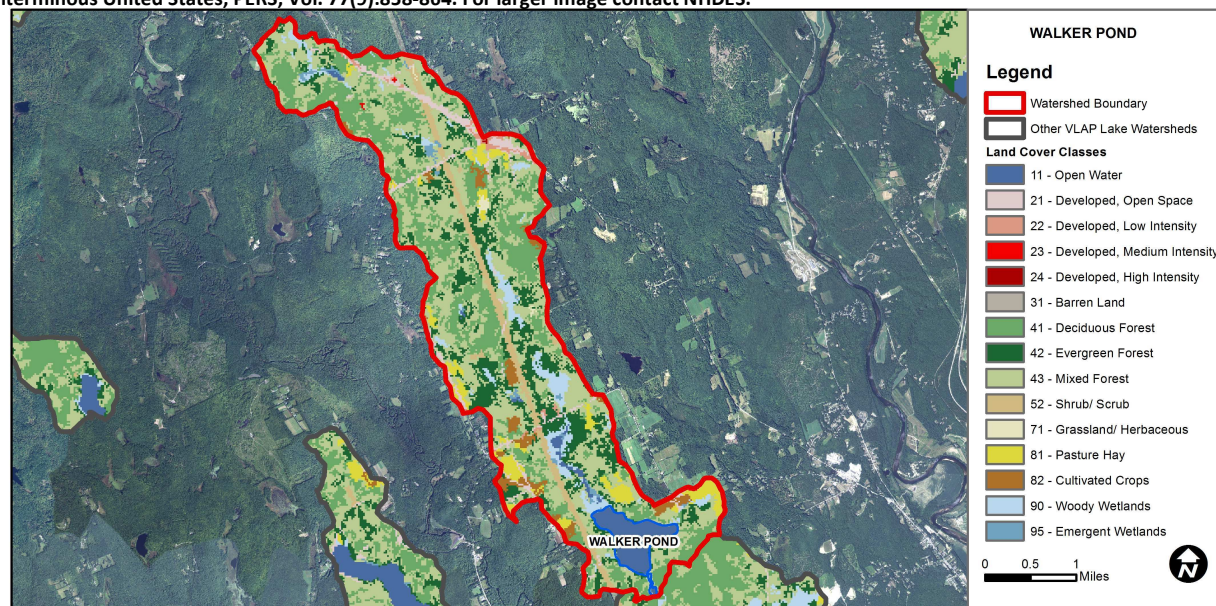| Year	Trophic class
1996	EUTROPHIC
2013	TROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Very Good	The calculated median is from 5 or more samples and is <= 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Bad	There are >10% of samples (minimum of 2), exceeding criteria with one or more samples considered large exceedance.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Very Good	The calculated median is from 5 or more samples and is <= 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Encouraging	There are no geometric means or there are > 2 single samples but those samples are within 75% of the geometric means criteria. More data needed.
	Chlorophyll-a	Good	There are at least 10 samples with one, but < 10% of samples, exceeding indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	3.97	Barren Land	0	Grassland/Herbaceous	0.29
Developed-Open Space	3.4	Deciduous Forest	22.58	Pasture Hay	4.64
Developed-Low Intensity	0.86	Evergreen Forest	15	Cultivated Crops	2.77
Developed-Medium Intensity	0.09	Mixed Forest	36.35	Woody Wetlands	4.64
Developed-High Intensity	0.02	Shrub-Scrub	4.38	Emergent Wetlands	0.8

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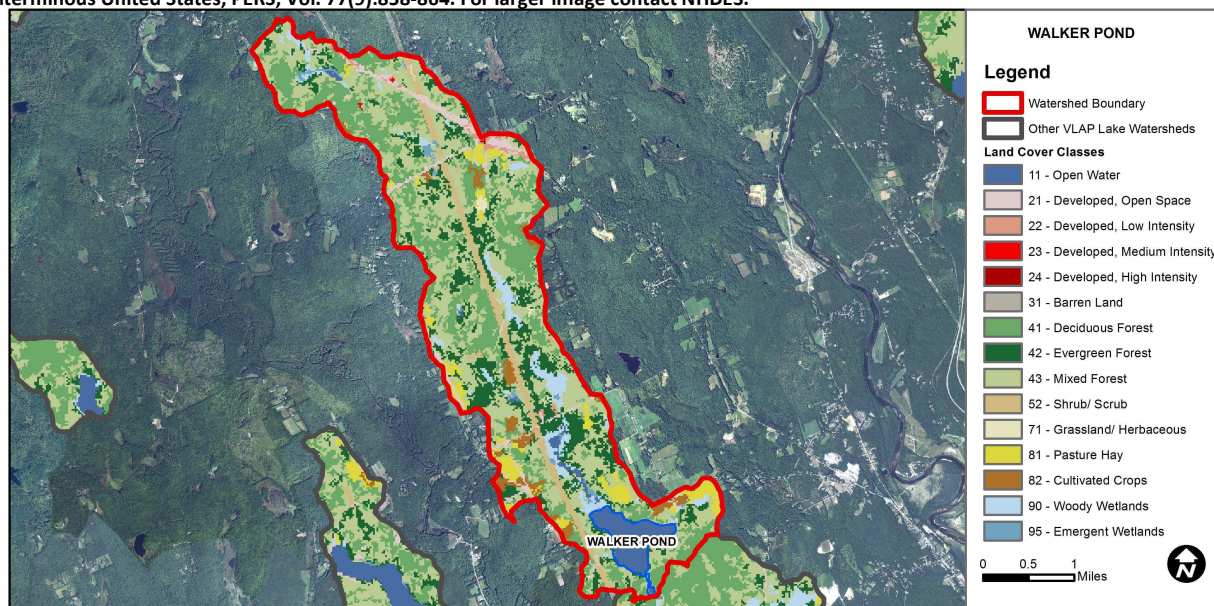| Year	Trophic class
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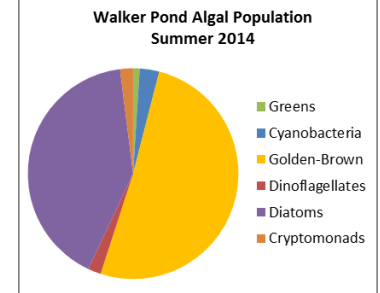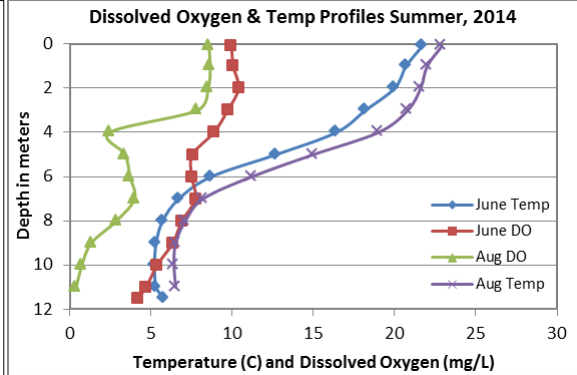| Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
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OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics*)

- **CHLOROPHYLL-A:** Chlorophyll levels were slightly greater than the state median in June, but decreased to low levels in August. Visual inspection of historical data indicates stable chlorophyll levels since 2010.
- **CONDUCTIVITY/CHLORIDE:** Deep spot conductivity and chloride levels remained slightly greater than the state medians, but much less than the state standards. Visual inspection of historical data indicates stable epilimnetic (upper layer) conductivity since 2009. Epilimnetic conductivity measured in 1997 was approximately equal to that measured in 2014 supporting the stable conductivity trend.
- **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) phosphorus levels increased slightly from June to August but remained low and less than the state median. Visual inspection of historical data indicates slightly variable epilimnetic phosphorus levels since 2009. Metalimnetic (middle water layer) phosphorus levels were slightly higher in June which likely contributed to the higher algal growth in June and then decreased to low levels in August. Hypolimnetic (lower water layer) phosphorus levels increased from low levels in June to average levels in August. The increase in hypolimnetic phosphorus is likely a result of the release of phosphorus into the lower layer from bottom sediments when dissolved oxygen levels decrease to less than 1.0 mg/L, as they had by August (see DO/Temp graphic).
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was lower in June when algal growth was higher, and improved in August when algal growth was lower. Transparency measured with the viewscope (VS) was generally better than that measured without and likely a better representation of actual water clarity. Average transparency was better than the state median. Visual inspection of historical data indicates slightly variable transparency since 2009.
- **TURBIDITY:** Epilimnetic and metalimnetic turbidities were low on each sampling event. Hypolimnetic turbidity increased slightly from June to August likely as a result of the accumulation of organic compounds in lower layer waters when dissolved oxygen levels decrease to less than 1.0 mg/L.
- **PH:** Epilimnetic pH levels were within the desirable range 6.5—8.0 units, however metalimnetic and hypolimnetic pH levels were less than desirable. Visual inspection of historical data indicates relatively stable epilimnetic pH since 2009.
- **DISSOLVED OXYGEN/TEMP:** Dissolved oxygen levels were generally good throughout the water column in June, but decreased to low levels in the hypolimnion in August. Bacteria in bottom sediments use dissolved oxygen to decompose organic matter. This leads to the decrease in dissolved oxygen levels in the hypolimnion as the summer progresses.
- **PHYTOPLANKTON:** Diatoms were the dominant algae on the June sampling event and by August Golden-Brown algae had become dominant. This follows a typical seasonal algal succession pattern in NH lakes.
- **RECOMMENDED ACTIONS:** Maintain current monitoring program to establish baseline chemical and biological data sets to monitor seasonal and historical water quality trends. The pond was also sampled by the DES Lake Survey Program to update the trophic status of the pond. This sampling was conducted in 2013, 2014 and will also take place in 2015. Coordinate sampling events with the Lake Survey Program to avoid sampling on similar dates. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff from roadways, steep slopes, residential, and agricultural properties in the watershed. Keep up the great work!

Dissolved Oxygen & Temp Profiles Summer, 2014

Walker Pond Algal Population Summer 2014

Legend: Greens, Cyanobacteria, Golden-Brown, Dinoflagellates, Diatoms, Cryptomonads

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m^3

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

Station Name	Table 1. 2014 Average Water Quality Data for WALKER POND								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	9.0	4.35	12	70.8	7	4.03	4.18	0.84	6.96
Metalimnion				70.4	9			0.79	6.29
Hypolimnion				70.0	13			1.74	6.07

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	N/A	Ten consecutive years of data necessary for analysis.	Chlorophyll-a	N/A	Ten consecutive years of data necessary for analysis.
pH (epilimnion)	N/A	Ten consecutive years of data necessary for analysis.	Transparency	N/A	Ten consecutive years of data necessary for analysis.
			Phosphorus (epilimnion)	N/A	Ten consecutive years of data necessary for analysis.

Historical Trend Epilimnetic Conductivty and pH

Historical Deep Spot Chlorophyll-a, Epilimnetic Total Phosphorus & Transparency Data